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FRANCE: NUCLEAR, MISSILE, AND SPACE DEVELOPMENTS
FOUO No. 455

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POST-1985 FUTURE OF FRENCH NUCLEAR FORCE DISCUSSED

Paris LE FIGARO in French 14 Feb 79 p 5

/Article by Paul-Marie de la Gorce/

[Text] Several facts that became apparent at the beginning of the year suggest that the future of the French nuclear force is already under discussion. Since January, the superstandards of the aircraft carriers, Foch and Clemenceau, little by little have been equipped with atomic weapons. Loans have been allotted for the preparation of a surveillance satellite. It has been decided to construct a medium-range air-to-ground missile, not to mention, of course, the most important thing of all, the construction of a sixth SNLE (missile launching nuclear submarine), the first of the second generation of French nuclear submarines.

Basically, the problems that are posed are reduced to only one, from the strategic point of view: the continuance after 1985 of France's potential for deterrence. And in practice this breaks down into four main questions: those that have to do with the future of the three present components of the strategic nuclear force and that of tactical atomic weapons.

No one questions the efficacy of the SNLE as the major instrument for deterrence. There is even a sort of general agreement in this regard among the public--a rather rare thing, by the way. Their present invulnerability is not debatable and the progress that the passage from the first to the second generation of French submarines will represent is considerable, both with regard to destructive power--with the replacement of the M4 missiles by the M20's--and to security--because they are more silent--and performance. But we must now realize that an effort must be made even beyond the refitting of the first five submarines. In fact, under present circumstances, and with six ships , the deterrent capability of this naval component for deterrence could be seriously reduced, either from seagoing risks--an American submarine was lost in this manner--or from a sudden and anonymous attack, which sailors call "a stab in the dark." We must not allow this risk--even a minimal one--to prevail. We must therefore agree that the total number of SNLE's must not be limited to 6, but increased to 8, or a maximum of 10.

Mobile Missiles

This only makes very good sense. We will recall that the construction of this type of submarine costs about three billion, to be extended over several years, which constitutes an extremely small part of military expenditures. And it is not a question of a sudden and great effort to be made all at once. On the contrary, it must be a methodical enterprise that would require the same amount of industrial and scientific means and personnel, but that would be carried out without interruption or abatement. For a very limited cost, the stake is outstanding: the French nuclear submarine can in fact strike anywhere in the world. It is therefore the only one that fits the indispensable concept of an "all-encompassing" strategy.

We would therefore be wrong to deal a blow to the future of the SSBS (ground-to-ground strategic ballistics) the first generation of which is on the Albion plateau. Doubtless the growing precision of hostile missiles will render it progressively vulnerable. But let us remember that its destruction would require enormous means--some 300 missiles, according to some estimates--and that the nuclear missiles used against French sites could not be launched simultaneously without mutual neutralization. Therefore there would be a delay before launching a counterattack. Once a decision has been made to launch an SSBS, one of its important advantages is that it can be used immediately. The progress that has been made furthermore shows that additional uses can be assigned to the SSBS's: the Albion missiles were improved with respect to destructive power and especially range--on the order of 2,500 kilometers--and it is probably regrettable that their development in quantity has been stopped.

In any case, the future generation of the SSBS's will necessarily be different. It can be a question only of mobile missiles: their use naturally presents special problems for a country with a relatively dense population, as in the case of France, but the invulnerability that would thus be acquired would be such a trump that the obstacles will have to be surmounted. The essential thing is to make sure that a possible enemy cannot attack French SSBS's without engaging in a massive and marked aggression, which would make it impossible for anyone to believe that the enemy did not want to attack France, or make it impossible for it to clothe itself in anonymity--as in the case of the destruction of a submarine--because it would then bring a major counterattack upon itself. This definitely shows that it is a most important deterrent.

The Mirage 4,000

Should there be a continuance of the air component of the strategic force? Many reasons lead to an affirmative answer. Versatility of use, the unpredictability of trajectories, a reasonable degree of invulnerability, and above all the possibility of making "demonstrations" before coming to the actual point of nuclear firing: a strategic air force has many advantages--even decisive ones. There is also the fact that the United

States and the Soviet Union are developing theirs. The solution for the replacement of the Mirage 14 is known: it is the Mirage 4,000, having a target capability that is extended by a medium-range missile, adding up to a total of 3,500 kilometers.

The future use of Pluton's as a tactical nuclear weapon is an integral part of the matter of the strategic force--for the simple reason that, in the French doctrine, which is perfectly coherent, it is not a question of nuclear artillery "to enrich" an eventual conventional conflict, but a means of replying to the beginning of an aggression--the last warning prior to the use of strategic means. Again this is the concept that must guide the choice of a new weapons system. Whether it is a question of a new ground-to-ground missile or a medium-range missile launched by the Mirage 2,000's, it must be viewed as being employed not against concentrations of armored cars engaged in battle, but rather against the entire logistics that make it possible to engage in it, behind the hostile armies.

All things considered, everything points to the necessity of preserving the present components of the nuclear forces, which are complementary and assure the cohesion of the system. Everything also indicates that choices should be made in accordance with rigorous respect for the French doctrine concerning deterrence, which alone justifies the effort to be made. But we must not infer from this that it is a question of an enormous, immediate, and ruinous effort--any more than we should believe that everything can remain as it is now and that the deterrence will be forever assured. Facts and statistics have long since proved that the requirements of nuclear forces involve only a limited portion of military spending, whereas the forces are essential to the security of the country. But only continuity and perseverance of effort guarantee its credibility. In this domain, the key word is "continuity."

CSO: 3100

EXPERIMENTAL REACTOR TO STUDY FAST REACTOR SAFETY

Paris CEA NOTES D'INFORMATION in French Oct 78 pp 2-6

/Text/ The experimental reactor, Cabri, located at the Cadarache Nuclear Research Center near Aix-en-Provence, was inaugurated jointly on 27 October 1978 by representatives of the German Ministry of Research and Technology and by French Atomic Energy Commission officials.

This inaugural ceremony was presided by Messrs Pierre Tanguy, director of the Atomic Energy Commission's Nuclear Safety and Protection Institute, and by Hans Hennies, director of development of reactor safety at the Karlsruhe Nuclear Research Center.

The goal of the experimental program associated with this reactor, whose features are unique in Europe, is to study the behavior of the fuel used in sodium-cooled fast reactors.

The Atomic Energy Commission and the Karlsruhe Nuclear Research Center of the Federal Republic of Germany are each paying half of the investment and development costs of the experimental program. In addition to these two organizations, Great Britain, Japan, the U.S. Department of Energy, and the U.S. Nuclear Regulatory Commission are participating in this project.

The reactor construction costs plus the costs of the associated experimental program, which will continue until 1983, come to approximately 200 million francs.

The Cabri program is a new illustration of the importance of the studies being done in the field of nuclear reactor safety. It is part of the general program which recently culminated when the Phebus reactor at Cadarache went critical. This reactor is used for safety studies of pressurized water reactors.

A major research and construction program for fast neutron sodium-cooled reactors began in France during the 1960s. Its main phases were:

a. The construction of Rapsodie, which went critical for the first time on 28 January 1967.

b. The construction of Phenix, which was connected to the network on 13 December 1973.

c. The construction of Super Phenix, now in progress at Creys-Malville.

Starting in 1967, the Atomic Energy Commission began a research program, called Scarabee, dealing with the analysis and consequences of failures in the fuel cooling system of this type of reactor. This program, whose detailed interpretation was done jointly with the United Kingdom's Atomic Energy Authority and the Kernforschungzentrum Karlsruhe GmbH of the Federal Republic of Germany, yielded some significant data.

Reactivity accidents occurring in a reactor during normal operations, or following a coolant failure not followed by a shutdown of reaction, are being studied in a second program, called Cabri.

The Cabri experimental program, conducted in pile, is essentially of a general or overall nature, in that it includes a study of the behavior of the fuel elements under the conditions most representative of those likely to occur in a power reactor.

The experimental facility includes a test reactor, Cabri, and a loop whose test cell is placed at the center of the core. The cooling defects are created in a second reactor, Scarabee N Aiguilles [needles], which is adjacent to Cabri.

Objectives and Programs

The evaluation of the safety of fast neutron sodium-cooled reactors includes the study of possible core accidents.

Their study is made extremely complex by the multiplicity of the possible initiating causes, but all possible foreseeable accidental sequences do have some common features:

a. They always go through a more or less significant fuel fusion phase.

b. They depend on physical phenomena taking place within a fuel assembly.

c. They require a knowledge of the physical processes of energy release and propagation between the fuel assemblies.

Cabri Program

The Cabri program is designed to simulate hypothetical accidents in order to study the behavior of the fuel needles during abrupt power surges, whether preceded or not by a coolant defect.

These power surges start from a power level (20 MWth) corresponding to the nominal operating conditions of a reactor, and go up to 1,000 times this power of 20 MWth in several hundredths of a second.

To simulate a coolant defect before the power surges, the flow of sodium around the test needle may be reduced to 1/20 of the nominal flow.

During these experiments, energy going up to 2 kilojoule per gram may be released in the test needle. This energy is enough to induce fusion, or even to vaporize the uranium oxide UO_2 and its shield. A classical thermodynamic interaction between this fuel and the sodium may occur. This interaction is expressed by the conversion of part of the thermal energy contained in the needle into mechanical energy transmitted to the sodium and to the surrounding structures.

The main phenomena and parameters that the Cabri program is attempting to analyze and quantify are the following:

a. Factor of conversion of thermal energy into mechanical energy.

b. Rupture threshold of the fuel needle shield.

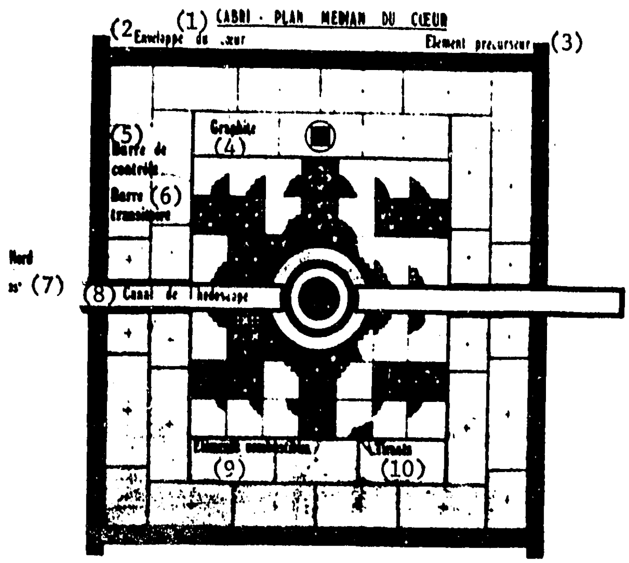
c. Moment of rupture of the shield in relation to the moment of power peak.

d. Speed of vaporization and ejection of sodium coolant surrounding the needle.

e. Movements of the fuel in its shield.

f. Recondensation of the sodium.

g. Role of fission products in the preceding phenomena.



Cross Section of the Auxiliary Core

Key:

1. Cabri -- Median Plane of Core
2. Core envelope
3. Preliminary element
4. Graphite
5. Control rod
6. Power surge rod
7. North
8. Hodoscope channel
9. Fuel elements
10. Braces

The length of the fissile fuel in the test needle will be 750 mm; its diameter will be 6.4 mm.

The experiments will first be done with a series of non-irradiated UO_2 needles, then with a series of mixed uranium oxide and plutonium oxide needles $(U\text{-}Pu)O_2$ pre-irradiated up to 60,000 megawatts/day per ton.

In all, about 30 tests will be done during the 5-year program scheduled to begin in mid-1978.

Equipment

The experimental unit consists of three parts.

The auxiliary or support reactor

This is a thermal reactor of the swimming pool type whose core consists of rods of UO_2 enriched to approximately 6 percent with U_{235}. It can provide levels of 20 MW thermal power corresponding to the test needle in linear power conditions (480 W/cm) for a large-size fast reactor and power surges whose value may be 1000 times greater for a short period of time.

It has six safety control rods and four "start-up" rods. These "start-up" rods are used to provide the required experimental conditions obtained by the rapid depressurization of helium 3.

The core is divided into two parts by a vertical slot 50 mm wide. This slot is used for observation of the test needle during power surges, by using a device called a hodoscope. Based on the detection of the fast neutrons emitted by the needle, this observation can show possible axial movements of the fuel.

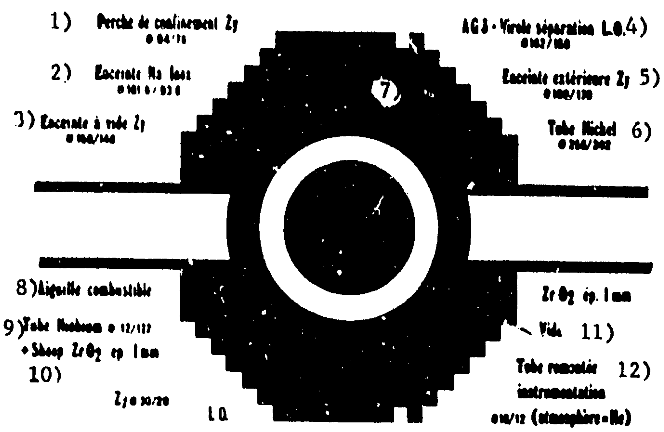
The Loop

This consists of two parts.

a. One part outside the pile consisting of circuits, pumps, and tanks designed to provide for the part in the pile and in the test section suitable flows of sodium and also of the organic liquid for cooling the structures.

b. A part in the pile or cell, which is placed vertically at the center of the auxiliary core.

The cell stays housed in the reactor and a new test device is placed in it for each experiment.



Cell -- Median Plane of Core

Key:

1. Containment rod
2. Stainless Na enclosure
3. Vacuum Zy enclosure
4. Organic liquid separation ring
5. External Zy enclosure
6. Nickel tube
7. Water
8. Fuel needle
9. Niobium tube
10. "Shoop" 1 mm thick
11. Vacuum
12. Instrumentation refitting tube

The Test Device

This holds the test needle and the instrumentation for measuring flows, pressures, and temperatures. It must contain the mechanical energy that will be released during the fuel-sodium interaction and the UO_2 particles that will be formed.

This equipment is replaced for each experiment.

Data Recording

This is done by the equipment shared by the two Scarabee N and Cabri-sodium cells (described above).

Scarabee Program

The major types of simulation scheduled during the program are:

a. Local plugging of a fuel assembly.

b. Complete blockage at the bottom of the fuel assembly with maintenance of power.

c. Complete reduction of the flow of sodium simulating a pump shutdown, with power reduction accompanying it for a given reactor.

d. To a lesser degree, power variations.

Studying these situations will provide some answers for the following objectives:

a. To clarify the dynamics and effects of destructions of the fuel element under its main aspects (thresholds of rupture of the shield, development of the secondary effects of this rupture, behavior of the melted fuel and consequences of its contact with the liquid sodium, possible propagation of this process).

b. To identify and analyze the preliminary signals which may at each phase make detection possible (temperature, pressures, fission products, etc.).

c. To develop one or more theoretical models to show these phenomena.

A large part of this program has already been done with the non-irradiated UO_2 fuel needles of the Rapsodie 24 MWth type with, in some cases, the simulation of internal pressure due to the fission gases of the irradiated fuels.

Two series of experiments have been done: one with a one-needle configuration, and the other with a seven-needle configuration.

This first test program was completed in July 1974 and work is now in progress to do the followup of the program under the name of Scarabee N Aiguilles. The same types of experiments will be done on pre-irradiated needles in the one and seven-needle configurations, then on larger clusters going up to 19 and 37 needles. Pre-irradiated needles will be used as fuel in Rapsodie, and in order to just do readjustments, pre-irradiated UO_2 PUO_2 needles will be used for Phenix.

Later, experiments on the propagation of fusion from one cluster of needles to another may be done between central clusters of 19 needles and six peripheral clusters of 10 needles (the number of needles is only given as an example).

The start of this new phase of the program is scheduled for the end of 1980, and the experiments are to be done over a 5-year period.

Test Equipment

The future Scarabee N Aiguilles equipment will be very close to the old equipment in its general design. So we will only give its essential features.

Reactor and Part Outside of the Pile

Both the old and new equipment include the test cell, located in the center of the reactor on plates, and Scarabee and Cabri share:

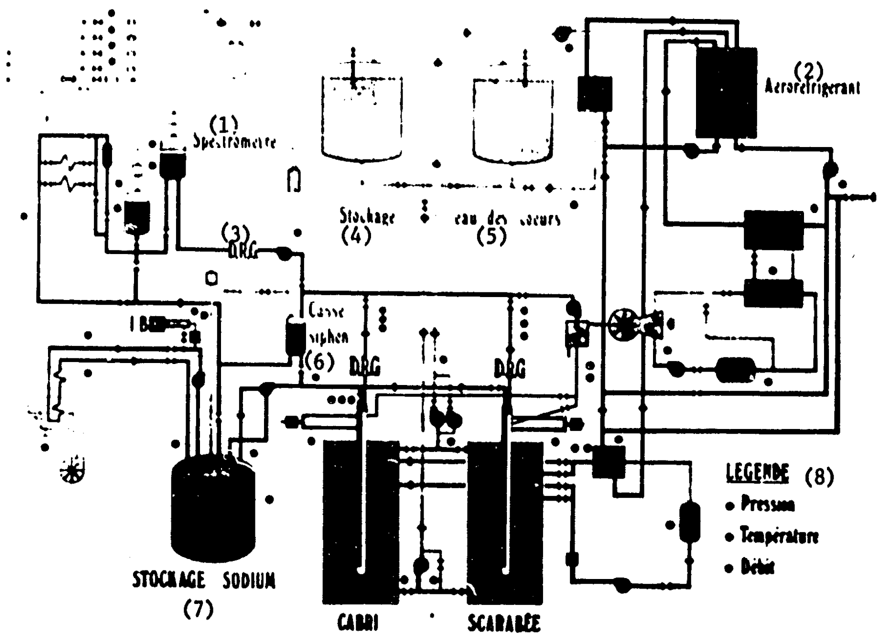
a. The external sodium supply circuit with different auxiliary circuitry (see figure following).

b. The neutron graphy system for examining the fuel needles before any major handling after an experiment.

c. The system for measuring the distribution of the fuel in the needle by γ detection.

Test Cell or Part Located In the Pile

This is located in the center of the reactor in two concentric enclosures which separate it from the reactor's water. Organic liquid circulates between these two enclosures to cool them. The thermal insulation betweeen the sodium circuits and the organic liquid circuit is provided by a vacuum enclosure. The cell consists of two parts: a fixed part which provides the sodium circulation and a removable part supporting the actual experimental unit itself.



SURA: General Design of Circuitry

Key:

1. Spectrometer
2. Air coolant
3. Shield rupture detection

4. Storage
5. Core water
6. Siphon breaker
7. Sodium storage
8. Legend: Pressure; temperature; flow

The removable part is the more important part of the equipment. It forms the support for the test channel inside which the fuel needles and the instrumentation are placed. It includes, going from bottom to top:

a. A pan to collect fuel debris in case of fusion.

b. The test channel and the fuel needle or needles.

c. Outlet connections.

d. A filter to stop oxide particles.

e. An outlet pressure valve.

Instrumentation and Recording

The cell has all the instrumentation (thermocouples and electromagnetic flowmeters) needed to follow closely the changes in thermohydraulic conditions in the test channel during the experiment, as well as the temperature in the fuel.

Pressure sensors will be used to measure the mechanical consequences of a possible sodium-melted fuel interaction.

The loop also has a DRG [Shield Rupture Detection System] which operates by detection of delayed neutrons and a spectrometer (germanium-lithium) placed either directly on the sodium or on argon, to measure the activity of the various fission products emitted.

These measurements are recorded on:

a. A 60-channel digital device (one point every 5 milliseconds).

b. An analog device using magnetic tapes.

Interpretation of Results

Thermohydraulic Phenomena

Qualitatively, a correspondence can be established between these phenomena and the type of power variations being studied. But in order to be able to extrapolate the results, we must have methods of calculation which can be used for power reactors.

Two problems are considered:

a. To determine as a function of the type of accident the domains of validity for the homogeneous and heterogeneous models of sodium boiling.

b. To develop new models to account for special phenomena: "chugging," melted fuel-sodium interaction.

Behavior of the Fuel-Shield Unit

The important points for safety are:

a. A study of the development and mode of failure of the shield

b. The condition of the fuel at this moment, particularly the amount of fuel melted

c. The possibility of occurrence and the effects of the melted fuel-sodium interaction.

Interpreting the experiments requires the development of highly complex computer programs, for the physical phenomena involved are numerous and complicated, especially during abrupt power variations. Moreover, most of the available measurements related to the fuel are measurements concerning its condition after the test (neutron graphy, gamma spectrometry, metallographic cross sections), and there are only a few temperature and pressure measurements which enable us to follow the kinetics of the phenomenon.

Finally, the characteristics of the materials, especially of the materials used in the shield, must be tested in this particular range of temperatures (900 and 1400°C) by tests outside of the pile.

Transposition of Results to Reactors

Three phases may be distinguished in this transposition.

a. Generalization of purely qualitative results, such as the absence of interaction in coolant accidents, the lack of serious danger in the case of a local jamming, the absence of overheating. The conclusions are valid only for the actual conditions of the experiment (at present, clusters of one and seven non-irradiated needles).

b. The improvement of the assumptions to be used in accident calculations: time of draining of the channel, the quantity of melted fuel, for example.

c. The use for reactors of computer models validated by experiments, in order to extrapolate the conclusions obtained up to now.

Reactor-safety research area: Cabri-Scarabee (foreground) for tests involving rapid neutron fuels; and Thebus (background) for light-water type fuels.

The two programs, Cabri and Scarabee, taken together, are called SURA /Fast Reactor Safety/. They are part of the broad experimental program being conducted in liaison with other units of the CEA /Atomic Energy Commission/ in order to develop fast neutron reactors.

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CSO: 3100

TRICASTIN URANIUM ENRICHMENT PLANT'S REGIONAL IMPACT REVIEWED

Paris LE MONDE in French 26 Jan 79 pp 13, 16

[Article by Bernard Elie]

[Text] Even while passing on Highway A7 in a hurry to reach the shores of the Mediterranean motorists cannot ignore the nuclear site at Tricastin. Between Pierrelatte and Bollene the two EURODIF[1] cooling towers, flanked by the four EDF [French Electric (Power) Company] reactors, constitute a concrete fortress to which the Donzere canal at its foot is what the moats formerly were to the structure of the Middle Ages.

For a long time the atom has had the "freedom of the city" in this region. But the installation of the CEA (Atomic Energy Commission)--for military applications--are hidden on the plain. The European isotope separation plant for civil applications would be difficult to conceal: its towers are 120 meters high and the surface coating plant where all the parts intended for EURODIF are nickel plated is big enough that two ships like the France could be contained within it.

Begun in 1974, the uranium enrichment plant and the electric power plant[2] to provide it with the necessary energy will indeed take part in the great nuclear rendezvous of 1980-1985. By the end of 1979 the plant should be operating at 25 percent of production capacity. The EDF power plant has been appreciably delayed from the original planning. The first of the four 925-Megawatt segments will be on line only in August 1979, which is nine months behind schedule. "But this delay will be fully made up by the time the fourth segment goes into operation at the end of 1980," is the assurance of Bene Cousyn, installations chief.

At this duplex construction site--one of the largest in Europe--the tapering off phase has commenced. The number of workers will no longer amount to the maximum achieved in the third quarter of 1978 when 7,738 were employed at the site.[3] For several months electricians, mechanics, assemblers, and welders have already been replacing carpenters and masons. A portion of these latter are being relocated in the north in order to take part in construction of the Cruso-Meysse and Saint-Albans-Saint Maurice-l'Eylise power plants. Others, foreign workers among them, are reluctant; from Pierrelatte they are less than two hours by train for the old port of Marseille or the rue de la Republique in Lyon.... For these reasons unemployment is beginning to appear in a region which up to now has blithely came through the crisis. At Pierelatte, in a Sonacotra lodging house with 300 beds, there is already an unemployment rate of one-third. In Ballene, the municipal officers elected in 1977 under the banner of the Union of the Left are worried: the number seeking employment has gone from 250 to 500 in 18 months. After the emphoria uneasiness is beginning to take hold. Upon what concrete will the region feed in two years.

The Department of Drome, and the quadrilateral formed by Pierelatte, Topulud, Bolene, and Saint-Paul-Trois Chateaux in particular, however, is used to these ups and downs in development. In the course of the last 30 years there were successively the Donzere-Mondragon Canal work with construction of the hydroelectric station (1946-1953), then the construction at Marcoule (1954-1958), and last, of the military nuclear plant at Pierrelatte (1960-1968). The decision to construct EURODIF was made 27 November 1973 and the French government's proposal of the Tricastin site for its construction came at a time when the region was again depressed.

"The mission for territorial development of Tricastin has played an effective role" is now the opinion of Dr Jean Mouton, Mayor of Pierrelatte (majority coalition). That opinion is shared by the mayor of Saint-Paul-Trois Chateaux, Marcel Gony (majority coalition), who still speaks of the "anarchic disorder" of the canal construction site.

The role of Jean-Pierre Roux, placed by the government in charge of coordinating this gigantic construction was a priori not an easy one. All the more so as to the usual difficulties in harmonizing relations among DATAR [Delegation for Territorial Development and Regional Action], elected officials and administrations, and in this case, two general contractors,--EURODIF and the EDF--there was added one of geographical nature. The 300 hectares of the construction site (250 for EURODIF and 50 for the EDF) straddle three communes (Pierrelatte, Bollene, and Saint-Paul-Trois Chateaux), two departments (Drome and Voucluse), and two administrative regions (Rhone-Alpes and Provence-Alpes-Cote d'Azur). "Do it in such manner that there is no talk of Triscastin" was the instruction given to Roux, head of DATAR at the time. May one consider that the EURODIF construction site has caused little talk?

It would be difficult to omit mention of two strikes which paralyzed civil engineering work for six weeks each time, witnessing the deep discontent of the personnel. It is impossible to forget the 11 workers who lost their lives and the two others who were seriously injured.[4] Nevertheless, certain initiatives intended to avoid repeating the mistakes of Fos have been taken. Among them, installation of a reception center--the Tricastin house--at the entrance to the construction center which combines all the services the workers may need--except, however, union representatives, which the unions deplore. The steps which were the subjects of experimentation here have made it possible to draw up the regulations governing "large construction sites, since then also applied elsewhere. As far as Jean-Pierre Roux is concerned success depends upon seeking "to bring the partners together rather than conducting a Kechnocracy."

A City and Its Problems

To receive between 16,000 and 18,000 people within a radius of 15 kilometers (7,000 to 8,000 workers, half of whom have wives and children) a minimum of concerted effort was in fact necessary. "All the mayors have taken part whatever their political labels," Roux acknowledges. To avoid any excessive concentration this population was dispersed into 10 communes. Certainly the beginning was to conduct a careful census of existing available lodgings--about 600. Then more were built--neither too many nor too few. More than 300 moderate rental housing projects were built, some of which were partitioned into rooms to serve for the time being as bachelor quarters. In addition, to assure that the "temporary" housing did not survive the construction site, recourse was had to mobile modules coming, in part, from Fos. Last, several trailer parks[5] were laid out, "sometimes with considerable delay," observes the Deputy Mayor of Bollene (Communist Party).

In that commune a trailer park with 166 places opened only in July 1978, or four years after the construction site was opened, "so that the trailer owners had to nestle for months in the municipal trailer park under grossly inadequate hygienic conditions," that elected official asserts. The GGT [General Confederation of Labor] representatives at Pierrelatte denounce the "discomforts of the living quarters" of which "one burned like a matchbox," and also, "the high rents demanded by Sonacotra at the same time as there was often no hot water." The union representatives explain, "The CGT had proposed constructior of leisure time villages where the stay of the workers and their families would have been more pleasant. The necessary equipment would then have been placed at the disposition of the management-employees committees. But they did not listen to us. It was preferred to pen the workers." There are those who have nostalgia for the workers' cities: "Those small detached buildings with a bit of a garden where one stayed for two, three or four years, were paradise after all!" maintains a carpenter who for a long time has been used to working in the construction sites of the Rhone valley.

In addition to housing such a construction site brings about a whole series of community installations; in total, 300 million francs have been invested, a third of which are considered specific, that is, related to the presence of the construction site and hence completely charged to the government. Sometimes the communes have done a "good business." For example, Pierrelatte acquired 19 hectares of ground for 650,000 francs upon which the government, under the heading of specific installations, has constructed installations (infant care centers, schools, and gymnasium) at a cost of 12 million francs.

A Basket Spreading Over Three Departments

Saint-Paul-Trois Chateaux, with a secondary school, a swimming pool, two gymnasiums, playing fields, and an entertainment center in no way need envy Pierrelatte. But Mayor Gony has more mixed feelings in his assessment of the advantages that the communes are deriving from those operations which accompany the construction site: "When a school group estimated at the start of 3.5 million francs in the end amounts to 5 million francs, the difference is at the commune's expense. Today, above all else, we are rich in hope," he adds ironically. The limitation in the business tax--for which the new rules of application have not been established--indeed make this tax no longer a preferred revenue source. "The difference between the amounts expected and those which we shall actually receive would have sufficed, had we known at the start, to make us anti-nuclear," states Gony. Then, angrily, he adds, "If we are living as some say in the anteroom of the Apocalypse, the tax revenues must be considered recompense for fear."

But the business tax--with a top limit or not--the community installations, specific or simply anticipated--do not constitute the principal fallouts from a construction site such as this. The most important in the end comes from the impetus to economic activity with the portion of the payroll spent in the region: between 10 and 15 million francs each month, 120 to 140 million annually. The rapid increase in the prices at which businesses are sold, the rate at which proprietors are enlarging or modernizing their stores, and the installation of large selling areas out in the brush attest to the good health of local commerce. But above all it is the construction contracts given to local and regional enterprises--directly or through subcontracting--which constitute veritable riches for the region. According to statistics compiled by the territorial development mission almost 35 percent of the total market for construction work and small supplies for EURODIF are going to enterprises in Rhone-Alpes (745 million francs) and Provence-Cotes d'Azur (625 million francs).[6] In the Rhone-Alpes region this basket has been mainly distributed in three departments: Drome (466 million), Rhone (185 million), and Isere (75 million). The effort made by the USSI firm within the scope of the EURODIF construction work, however, has been up against the "lack of competitiveness" of the regional enterprises.

"We were greatly disappointed when we learned that these enterprises never had the desire to fight. For example, by combining within the scope of an inter-trade group of enterprises they would have obtained the means for winning more contracts," explains Mr Parmentier, in charge of installations planning at EURODIF. Nevertheless the results are better than those achieved by the EDF in construction of its power station: only 10 percent of the total investment (4.1 billion 1974 constant francs), or 400 million, went to regional enterprises. "We would like to have done a little better, but it is not easy: EDF awards total contracts in order to obtain the best prices," says Rene Cousyn, in charge of installations planning for the power plant. Specifically to improve further its participation, Rhodanim, the association for promotion of small and medium sized industries of the Rhone valley has established, at another EDF construction site--that of the Cruas-Meysse power plant--a subcontracting exchange. "We want to have those who place orders specify their requirements and to give consideration to regional enterprises. We are also trying to place those who solicit orders, even if by rapid professional training, at a level of discussion sufficient for obtaining contracts," explains Mr Desjardins, the engineer in the industrial promotion department of the chamber of commerce and industry at Valence. That association has 200 enterprises on file and can have recourse, if needed, to the files of the chamber of commerce. If this activity bears fruit, it could enable Drome, and secondarily Ardiche, to attain new peaks in a few years. But already in that department, Drome, which is very little industrialized, people are wondering about the future: what will they do tomorrow?

FOOTNOTES

1. EURODIF is a company privately organized but whose capital stock is owned by Spain (11.1 percent), Belgium (11.1 percent), Italy 25 percent), the French COGEMA firm, a subsidiary of the CEA (27.8 percent), and SOFIDIF (French-Iranian Diffusion Company)--40 percent of whose stock is held by Iran and 60 percent by COGEMA--(25 percent). France thus holds 43 percent of EURODIF's capitalization. The latter controls three companies: SOCATRI (Tricastin Auxiliaries Company), responsible for the plant's construction; EURODIF Production, responsible for operations; and COREDIF (Company for Construction of a New Diffusion Plant). The general contractor for the plant at Tricastin is the USSI (Isotope Separation Plant) Company, which previously constructed the military plant of Pierrelatte and has been assigned the preparation of the COREDIF project.

2. The four segments of the power plant represent total installed capacity of 3,700 megawatts, which is greater than required for EURODIF operation (3,100 megawatts). Because of restrictions imposed by maintenance a portion of the energy required by the enrichment plant will have to be obtained from outside sources (about 400 megawatts for eight months of the year).

3. In August 1978 the number of workers directly involved at the site was 5.5+1 (57 percent, or 3,160 for the EDF and 43 percent, or 2,381 for EURODIF), the other 2,000 being auxiliary employees.

4. Six of these fatal accidents occurred on the EURODIF construction site, four on the EDF site, and one outside of those two sites.

5. On 30 September 1978 there were 563 trailer spaces available in four communes. The number of beds managed by SONACOTRA on that date amounted to 2,158, of which 1,031 (48 percent) were in modular housing and 1,127 (52 percent) in moderate rental housing.

6. In constant francs the total amount of EURODIF investments amounted to 9.5 billion. At the end of September 1978 the amount of contracts going to regional or local enterprises either directly or through subcontracting reach 1.4 billion francs.

11,706
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BRIEFS

NEW BALLISTIC MISSILE--In 1980, the Ballistics and Space Systems Division of SNIAS will carry out the first experimental firing of the new M4 ballistic missile which is to replace the current M2 and M20 missiles on the navy's missile-launching nuclear submarines. The M4 missile will be placed first on the "Inflexible," which is to be commissioned in 1985. [Text] [Paris LE MONITEUR DE L'AERONAUTIQUE in French Mar 78 p 7]

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